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SENSITIVE PLANT SURVEYS IN THE
BULL RIVER AND ADJACENT DRAINAGES
U.S.D.A. FOREST SERVICE - REGION 1
KOOTENAI NATIONAL FOREST
MONTANA

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INTRODUCTION

The Bull River is a prominent drainage located in Sanders County, northwestern Montana. Originating on the western slopes of the Cabinet Mountains, the river flows south for approximately 27 river miles before feeding into Cabinet Gorge Reservoir.

Northwestern Montana is strongly influenced by moist maritime airmasses that move through from the Pacific Ocean. The airmasses provide abundant rain- and snowfall, mild winter temperatures, and generally humid cloudy conditions. These conditions have allowed for the development of a forest complex similar to adjacent northern Idaho. Following the habitat classification of Pfister et al. (1977), valley bottoms are dominated by a Tsuga heterophylla / Clintonia uniflora (western hemlock / queencup beadlily), the moister Aralia nudicaulis (wild sassafras) phase, and Thuja plicata / Clintonia uniflora (western red cedar / queencup beadlily) habitat types. Higher slopes support a transitional Pseudotsuga menziesii / Linnaea borealis (Douglas-fir / western twinflower) habitat type.

Numerous wildlife species, including grizzly and black bear, deer, elk and mountain goat, are found in the Bull River valley. The bottomland vegetation adjacent to the river has been altered through various land use practices such as logging of the dominant cedar and hemlock forests, conversion of wet meadows to hay meadows, and invasion by non-native weedy species. Except for wetland areas, limited amounts of native vegetation remain intact. On the hillsides surrounding the valley there has been some logging, and in places weedy species are a problem; however, much of this area is still vegetatively intact.

This report contains information on a rare plant inventory conducted on 19-23 June and 24-28 July 1989 in portions of the Bull River valley. These surveys emphasized the verification of previously documented sensitive plant sites, and inventory of previously unsurveyed locations that appeared to contain suitable habitat for such species. Additionally, a day and a half was spent surveying U.S. Forest Service lands (Kootenai National Forest) near Rock Creek, Marten Creek, and the mouth of the Vermillion River for Satureja douglasii, a rare plant known to occur on private lands on Rock Creek, but not yet known from U.S. Forest lands in this vicinity.

METHODS

On the basis of existing floristic information, a list of rare plants known or suspected to occur in the Bull River valley was prepared. Species included were:

- Cirsium brevistylum¹ (short-styled thistle)
- * Allium fibrillum (fringed onion)
- Brasenia schreberi (water-shield)
- * Calamagrostis tweedyi (cascade reedgrass)
- * Clarkia rhomboidea (common clarkia)
- * Cypripedium calceolus var. parviflorum (small yellow lady's-slipper)
- * Geocaulon lividum (northern bastard toad-flax)
- Halenia deflexa (spurred gentian)
- * Howellia aquatilis (water howellia)
- Lilium columbianum (tiger lily)
- * Lomatium geveyi (Geyer's biscuit root)
- Madia minima¹ (small-head tarweed)
- Rubus ursinus (Pacific blackberry)
- * Satureja douglasii (yerba buena)
- Spiraea x pyramidata (pyramidal spiraea)

* = Region 1 sensitive species

¹ = taxa previously recorded in the Bull River drainage

Ocular reconnaissance was used to locate potentially rare plant species during searches in the Bull River valley and surrounding areas. Owing to the extent of the area to be covered and the time constraints, the most likely habitats for these species were searched in detail, while other areas were covered as time allowed.

Field collections were identified using Flora of the Pacific Northwest (Hitchcock and Cronquist 1973)⁴, Vascular Plants of the Pacific Northwest (Hitchcock et al. 1955-1969), and Vascular Plants of Montana (Dorn 1984). Voucher specimens were collected for several areas.

The first section of this report includes information pertaining to the rare plant species that were found to occur on Forest Service lands: Lomatium bicolor var. bicolor, Madia minima, Heterocodon rariflorum, and Spiraea x pyramidata. Although none of these species are currently on the U.S. Forest Service Region 1 (Northern Region) sensitive species list, they are on the Montana Natural Heritage Program list of plant species of special concern for Montana. The reports emphasize information on populations found in the Bull River valley. The numbers in parentheses following the site names refer to the Natural Heritage Program Element Occurrence Record for that location (records are found at the end of the respective sections for each species).

Additionally, although a comprehensive plant inventory of the valley was not attempted, a list of observed vascular plants was prepared (pp. 54-60). This list is organized alphabetically by family, genus and species.

SPECIES OF SPECIAL CONCERN

Lomatium bicolor var bicolor

I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Lomatium bicolor (S. Watson) Coulter & Rose var. bicolor
2. COMMON NAME: bicolor biscuitroot.
3. FAMILY: Apiaceae (= Umbelliferae, Carrot Family).
4. GENUS: There are approximately 75 species in the genus Lomatium in western and central North America (Hitchcock et al. 1955-1969). Twelve of these species occur in Montana (Dorn 1984).
5. SPECIES: Most of the species in this notoriously difficult genus are fairly well defined; however, to distinguish among them usually requires a combination of several characters (Hitchcock et al. 1955-1969). Lomatium bicolor is distinguished from other species in the genus Lomatium that occur in western Montana by the following characters: lace-like leaf segments, yellow flower petals, long narrow fruit, somewhat bulbous roots, and a slender stature (Dorn 1984, Hitchcock et al. 1955-1969, Schlessman 1984). In Montana, it is represented by var. bicolor (Lincoln Constance, pers. comm.).

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

2. STATE: This species was listed as a rare disjunct in Montana by the Montana Rare Plant Project (Lesica et al. 1984). The L. bicolor var. bicolor populations of Montana are widely separated from the main species range, which is centered in southeast Idaho and northern Utah (Schlessman 1984).

The Montana Natural Heritage Program (Shelly pers. comm.) currently designates Lomatium bicolor var. bicolor as "globally rare" (global rank = G4T3). It is also listed as "imperiled in Montana" (state rank = S2), where it is known from Ravalli (12 populations) and Sanders (1 population) counties. Variety bicolor also occurs in northern Utah, southwestern Wyoming, and southeastern Idaho.

None of the state ranks listed above currently provide any direct legal protection for L. bicolor var. bicolor.

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Lomatium bicolor var. bicolor has somewhat slender stems that are 12-30 inches in height. These stems bear fine lace-like leaves typical of the Carrot Family. Small clusters of yellow flowers occur in a flat topped inflorescence (flower cluster). Once pollinated, flowers mature into long, narrowly elliptic fruits, which have slight wings along the edges. Long tuberous roots with bulbous thickenings aid in this plant's stability and nutrition.
2. **TECHNICAL DESCRIPTION:** Plants acaulescent or caulescent with several basal and one or two cauline leaves. Roots irregularly tuberous, up to 7.5 cm. long and 2 cm. in diameter. Leaves ternately-pinnately compound and pinnately to quinately dissected; ultimate leaf segments (30-) 80-250, filiform, 2.5-5 mm long, 0.2-0.4 (-0.7) mm. wide, the apices acute. Fruiting pedicels 1-10 mm. long at maturity. Mericarps lingulate in cross section, elliptic in outline, 8-16 mm. long, 1.5-4.5 mm. wide; lateral wings of the mericarps 0.3-0.7 mm wide; oil canals 1 (-3) in the intervals, 2-4 on the commissure (Schlessman 1984).
3. **LOCAL FIELD CHARACTERS:** Lomatium bicolor var. bicolor overlaps in its distribution, and co-occurs with, a number of other species in the genus Lomatium in Montana. A number of characteristics are necessary to distinguish these species from one another (Hitchcock et al. 1955-1969). Lomatium bicolor var. bicolor has a more slender stature, and less distinctly winged fruits, than the very robust and common L. dissectum. Lomatium geyeri is more similar in

stature to L. bicolor var. bicolor, but has wider ultimate leaf segments, and white or purple flowers. Lomatium bicolor var. bicolor and Lomatium sandbergii both have yellow flowers and very fine lace-like leaf segments, but the latter has shorter fruits, short leafy shoots, and roots that are generally not bulbous (Schlessman 1984).

D. GEOGRAPHICAL DISTRIBUTION

1. RANGE: In Montana, L. bicolor var. bicolor is known from 12 locations in the Bitterroot Mountains (Bitterroot National Forest), Ravalli County, and a single recently recorded site in Sanders County. The distribution of L. bicolor var. bicolor in Montana is shown in Figure 1, p. 11.

The Berray Trail (001) population in Sanders County occurs on the Kootenai National Forest. Population information for this site, including size, elevation, location and associated species, is included on p. 12. The exact location of the Berray Trail (001) subpopulations are marked on a U.S.G.S. topographic map, p. 13.

Variety bicolor is also known from northern Utah, southeastern Idaho, and southwestern Wyoming. It does not appear to be very common in either Wyoming (Hollis Marriott, pers. comm.) or Utah (Ben Franklin, pers. comm.).

E. HABITAT

1. ASSOCIATED VEGETATION: In Montana, Lomatium bicolor var. bicolor occurs from mid- to high elevations in the mountains, in gravelly scree or rocky habitats. These sites appear to be moist in spring and early summer, but are dry by August. Although the Berray Trail (001) subpopulations were not in areas of dense vegetation, they were associated with a number of other plant species, including:

Aspidotis densa (podfern)
Calochortus apiculatus (pointed mariposa)
Cryptogramma acrostichoides (parsley fern)
Lomatium ambiguum (swale desert parsley)
Lomatium dissectum (fern-leaved lomatium)
Penstemon lyallii (Lyal's beardtongue)
Penstemon wilcoxii (Wilcox's penstemon)

Physocarpus malvaceus (mallow ninebark)
Selaginella wallacei (Wallace selaginella)

2. **TOPOGRAPHY:** In Montana, all of the L. bicolor var. bicolor populations occur on steep, rocky scree slopes. These sites often have a more southerly or easterly aspect. The individual plants of the Berray Trail (001) subpopulations were established in the crevices of rocky outcrops and on steep scree slopes.
3. **SOIL RELATIONSHIPS:** In Montana, populations of L. bicolor var. bicolor occur on mineral soils that appear to contain little or no organic matter. This species possesses a stout root system, which can grow deep into rock crevices. This allows individuals to become established on rocky scarps or on moving scree slopes (pers. obs.).
4. **REGIONAL CLIMATE:** The mountainous region of northwestern Montana is dominated by a cool Pacific temperate climate. Winters in this region are cold and snowy, and the summers are warm and rainy. The highest amounts of precipitation accumulate during the period from November through January in the form of snow. The weather collection site at Trout Creek Ranger Station is approximately 15 miles east of the Bull River valley, and at an elevation of 2,370 feet (the L. bicolor var. bicolor subpopulations are at 4,000 to 4,700 feet in elevation). For the period from 1951-1980, the July mean temperature at Trout Creek Ranger Station was 65.0° F, the January mean was 24.1° F, and the mean annual precipitation was 30.49 inches (U.S. Department of Commerce 1982).

F. POPULATION DEMOGRAPHY, BIOLOGY AND SPECIATION

1. **PHENOLOGY:** Populations of L. bicolor var. bicolor in the Bull River valley may begin to flower in late May to early June, and bear immature fruits by the end of June. According to Schlessman (1984), this species (across its range) flowers from April through June, with fruits maturing from late April to early August.
2. **POPULATION SIZE AND CONDITION:** The two observed subpopulations in the Bull River valley collectively contained fewer than 1,000 individual plants. Although not large, the subpopulations did appear to be in good condition, with numerous fruiting individuals.

3. REPRODUCTIVE BIOLOGY

- a. **TYPE OF REPRODUCTION:** Lomatium bicolor var. bicolor is a perennial species known to reproduce by seed (Schlessman 1984). New ramets may also be produced through extension of the root system (pers. obs.).
- b. **POLLINATION BIOLOGY:** The umbels (inflorescences) of L. bicolor var. bicolor contain both perfect (male-female) flowers and staminate (male) flowers. Schlessman (1984) reports that species in this group are known to reproduce by pollen transfer from one flower to another on the same plant (geitonogamous selfing), and by outcrossing. Pollination is then nearly assured, and some seed production can occur even under adverse conditions.

Although there is often overlap in flowering times of co-occurring species, hybridization between species in the tuberous Lomatiums is apparently not common. Controlled interspecific crosses demonstrated strong postmating isolating mechanisms (Schlessman 1984).

- c. **SEED DISPERSAL AND BIOLOGY:** The seeds of Lomatium species are often winged, and wind dispersal may be possible (Schlessman 1984). However, due to seed weight and size, it is doubtful that seeds of L. bicolor var. bicolor are blown very far from the parent plant.
- d. **PHYLOGENY AND SPECIATION:** Hybridization does not appear to be pronounced in the tuberous Lomatiums. Instead, geographical isolation and divergence are probably the sole source of speciation (Schlessman 1984). Schlessman (1984) contends that L. bicolor var. bicolor is most closely allied with L. bicolor var. leptocarpum, and secondarily with L. quintuplex. However, Lincoln Constance (pers. comm.) recently commented that L. quintuplex may in fact be even more closely allied with L. bicolor var. bicolor than var. leptocarpum. Further study is necessary to better understand the systematics of these species.

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

- a. **COMPETITION:** This species appears to be restricted to mineral soils that are also not heavily vegetated. It is possible that L. bicolor var. bicolor is shade-intolerant. Interspecific competition does not appear to be a factor in this species distribution.
- b. **HERBIVORY:** Unknown.

H. LAND OWNERSHIP

1. Berray Trail (001) - U.S. Forest Service, Kaniksu National Forest, managed by the Kootenai National Forest.

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- A. **THREATS TO CURRENTLY KNOWN POPULATIONS:** There are currently no observed threats to the Berray Trail (001) L. bicolor var. bicolor subpopulations.
- B. **MANAGEMENT PRACTICES AND RESPONSE:** Not known.
- C. **RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:** The locations of the known subpopulations of L. bicolor var. bicolor on the Kootenai National Forest are in areas that are unlikely to be affected by most management practices, and the subpopulations are probably self-maintaining.
- D. **RECOMMENDATIONS FOR FURTHER ASSESSMENT:** The Berray Trail (001) population needs no further assessment. However, Lomatium bicolor var. bicolor was observed on only one peak in the Bull River valley. Although not extensive, there is more habitat on Forest Service lands in the valley that may support populations of this species.
- E. **SUMMARY:** During surveys of the Bull River valley in northwestern Montana in 1989, one population of Lomatium bicolor var. bicolor was found on the Kootenai National Forest, Sanders County, Montana. The Berray Trail (001) population represents a range extension of approximately 130 miles northwest of the nearest known populations of L. bicolor var. bicolor, which are located in the Bitterroot Mountains of Montana. Although not extensive, there is more habitat that may

support populations of L. bicolor var. bicolor in the Bull River valley.

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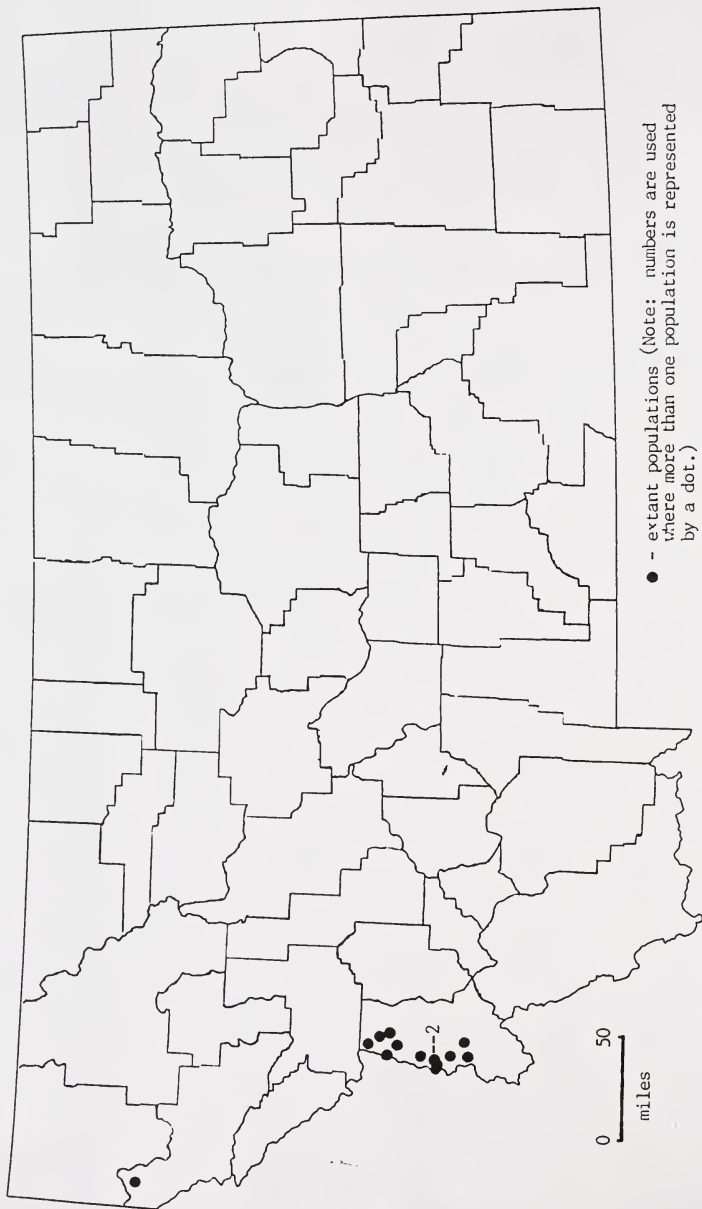


Figure 1. Distribution of Lomatium bicolor var. bicolor in Montana.

Name: LOMATIUM BICOLOR VAR BICOLOR
Common Name: BICOLOR BISCUITROOT

Global rank: G4T3 Forest Service status: NONE
State rank: S2 Federal Status: NONE

Element occurrence code: PDAP11B020.001

Survey site name: BERRY TRAIL
County: Sanders

USGS quadrangle: IBEX PEAK

Township-range: 027N 033W Section: 01
Township-range comments: SE4NW4

Survey date: 1989-06-23	Elevation: 4880
First observation: 1989	Slope/aspect: 0-35% / SOUTH
Last observation: 1989-06-23	Size (acres): 4

Location:

BULL RIVER VALLEY, CA. 1.5 MILES EAST OF HIGHWAY 56 AND CA.
1 MILE NORTH OF F.S. ROAD #407, ALONG THE BERRY MOUNTAIN
TRAIL.

Element occurrence data:

101-1000 PLANTS, FRUITING.

General site description:

ROCKY OUTCROPS AND SCREE SLOPES (POSSIBLY SILTSTONE), WITH
L. DISSECTUM, L. AMBIGUUM, CALOCHORTUS APICULATUS,
SELAGINELLA WALLACEI, PENSTEMON WILCOXII, AND CRYPTOGRAMMA
ACROSTICHOIDES.

Land owner/manager:

KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:

VOUCHER - SCHASSBERGER, L.A. (283), 1989, MONTU. DUPLICATE
SPECIMEN VERIFIED BY L. CONSTANCE, UNIVERSITY OF CALIFORNIA.
SECOND SUBPOPULATION AT 4,080 FT.

Information source:

SCHASSBERGER, L.A. AND J.S. SHELLY. MONTANA NATURAL HERITAGE
PROGRAM, 1515 EAST SIXTH AVE., HELENA, MT 59620.

Madia minima

I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Madia minima (Gray) Keck.
2. COMMON NAME: small head tarweed.
3. FAMILY: Asteraceae (=Compositae, Sunflower Family).
4. GENUS: There are approximately 17 species of Madia native to western North America and Chile (Hitchcock et al. 1955-1969). According to Dorn (1984), four of these species occur in Montana.
5. SPECIES: Madia minima commonly occurs with Madia exigua in Montana. Technically, it is distinguished from the latter by the possession of achenes that are compressed at right angles to a radius of the head (unique in the genus), and leaves which are mostly or all opposite (Hitchcock et al. 1955-1969).

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

2. STATE: Madia minima is currently listed by the Montana Natural Heritage Program (Shelly 1989) as apparently secure globally (global rank = G4). In Montana, it is listed as "critically imperiled because of extreme rarity" (state rank = S1). The Montana populations of M. minima are at the periphery of the main range of the species, which lies to the west.

None of the state ranks listed above currently provide any direct legal protection for M. minima.

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** Small, slender, branching annual usually 6 (12) inches tall. The small ($3/4$ inch by $1/16$ inch wide), narrowly oblong leaves are mostly opposite on the branched stems. The herbage is lightly short-hairy, and the plant is sticky-glandular above. Flowering heads (head = clusters of flowers in the Sunflower Family) are found in the forks of the stems. After pollination, minute yellow flowers form seeds compressed at right angles to the radius of the heads (these have the appearance of a cluster of green bananas around a fruiting axis).
2. **TECHNICAL DESCRIPTION:** Slender, divaricately branching annual up to 1 or rarely 2 dm. tall, more or less pubescent, becoming glandular above; leaves mostly opposite, linear or linear-oblong, 1-2 cm. long, 1-2.5 mm. wide; heads in the forks of the stem and in small cymose clusters, terminating the branches; involucre of 3, 4, or most commonly 5 bracts, 2-4 mm. high, bearing conspicuous, tack-shaped, only slightly or moderately viscid glands; rays minute; achenes often with a minute incurved apical beak, the body somewhat compressed at right angles to a radius of the head, the involucre bracts thus broad-backed; receptacular bracts united about the solitary fertile disk flower (1 or more additional, normally fertile disk flowers sometimes present) (adapted from Hitchcock et al. 1955-1969).
3. **LOCAL FIELD CHARACTERS:** This species is distinguished from all others in the genus Madia by achenes that are compressed at right angles to a radius of the stem. In the Bull River valley, M. minima co-occurs with M. exigua. From a distance the two species are similar in appearance, but upon close inspection, M. minima is distinguished by having achenes that are laterally compressed, an opposite rather than alternate leaf arrangement along the stem (at least above), and a somewhat smaller stature than M. exigua. A line drawing of this species is presented on p. 20.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** The range of Madia minima extends from California to southern British Columbia and then east through northern Idaho to western Montana. Madia minima is currently known from a total of 7 locations in western Montana: Sanders (3), Lincoln (2), Ravalli (1), and Missoula (1) counties. The known distribution of the species in Montana is presented in Figure 3, p. 21.

The three locations in Sanders County occur on hillsides that flank the Bull River valley: Bull River Cliffs (005), Dry Bench (006) and Goat Rocks (007). These sites occur on Kootenai National Forest lands. Survey information for these populations is found on pp. 22-24 (Element Occurrence records). U.S. Geological Survey maps detailing the exact locations of the populations are presented on pp. 25-27.

E. HABITAT

1. **ASSOCIATED VEGETATION:** In the Bull River valley, Madia minima occurs on rocky, moss covered ledges with sparse vegetative cover. Associated species (at one or more sites) include:

Calamagrostis rubescens (pinegrass)
Clarkia pulchella (ragged robin)
Collinsia parviflora (small-flowered blue-eyed Mary)
Epilobium paniculatum (autumn willow-herb)
Festuca idahoensis (Idaho fescue)
Heterocodon rariflorum (western pearl-flower)
Madia exiqua (little tarweed)
Mimulus breweri (Brewer's monkey-flower)
Penstemon lyallii (Lyall's penstemon)
Selaginella wallacei (Wallace selaginella)

All of the sites for M. minima were dominated by small annual species.

2. **TOPOGRAPHY:** Madia minima populations occur on moss covered, rocky outcrops on the steep hillsides that flank the Bull River valley. Populations occupy slopes ranging from 8-35 percent, and occur at elevations from 3,000 to 3,600 feet. This type of habitat is fairly common on the hillsides flanking the valley.

3. **SOIL RELATIONSHIPS:** Madia minima was found in areas with less dense vegetation, and it is possible that it requires bare soil for seedling establishment. In north central Washington, Madia glomerata populations are also found in bare soils, which were found to be low in available nitrogen, sulphur and phosphorus. It is possible that these soil characteristics are limiting the distribution of this species. It is more likely that M. glomerata also requires bare soils for seedling establishment, and has merely adapted to the lowered nutrient availability at these sites (Tiedmann 1972).
4. **REGIONAL CLIMATE:** The mountainous region of northwestern Montana is dominated by a cool Pacific temperate climate. The winters are cold and snowy, and the summers are warm and rainy. The highest amounts of precipitation accumulate during the period from November through January in the form of snow. The weather collection site at Trout Creek Ranger Station is approximately 15 miles east of the Bull River valley, and at an elevation of 2,370 feet (the M. minima sites are at 3,000 to 3,600 feet in elevation). For the period from 1951-1980, the July mean temperature at Trout Creek Ranger Station was 65.0° F, the January mean was 24.1° F, and the mean annual precipitation was 30.49 inches (U.S. Department of Commerce 1982).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** Depending on the latitude, elevation and aspect of M. minima populations, individuals flower and fruit from May through July (Hitchcock et al. 1955-1969). In the Bull River valley this species is flowering and fruiting from mid-June through early July (pers. obs.).
2. **POPULATION SIZE AND CONDITION:** Madia minima populations in the Bull River valley were generally quite large, ranging from 400 to 10,000 individuals. The populations appeared to be in good condition and were fruiting prolifically in 1989.

3. REPRODUCTIVE BIOLOGY

- a. TYPE OF REPRODUCTION: This annual species reproduces only from seed.
- b. POLLINATION BIOLOGY: Unknown.
- c. SEED DISPERSAL AND BIOLOGY: Unknown

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

- a. COMPETITION: This small annual may be a poor competitor. See the discussion under soil relationships, p. 16.
- b. HERBIVORY: Unknown.

H. LAND OWNERSHIP

- 1. U.S. Forest Service, Kaniksu National Forest, managed by Kootenai National Forest.

Bull River Cliffs (005)
Dry Bench (006)
Goat Rocks (007)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

- A. THREATS TO CURRENTLY KNOWN POPULATIONS: There are currently no apparent threats to populations of Madia minima in the Bull River valley on Kootenai National Forest lands.
- B. MANAGEMENT PRACTICES AND RESPONSE: Madia minima and M. exilqua were often found in association; however, in low-lying areas where timber harvesting had occurred only Madia glomerata was observed. It is not known why M. minima was not present in such areas.
- C. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS: The locations of the known populations on the Kootenai National Forest are in areas that are unlikely to be affected by most management practices, and the populations are probably self-maintaining.
- D. RECOMMENDATIONS FOR FURTHER ASSESSMENT: There is additional habitat along the Bull River drainage that

may contain populations of Madia minima.

- E. **SUMMARY:** During rare plant surveys of the Bull River valley in 1989, three populations of Madia minima were located on the hillsides that flank the Bull River on Kootenai National Forest lands, Sanders County, Montana: Bull River Cliffs (005), Dry Bench (006) and Goat Rocks (007). Populations of M. minima tend to be quite large (up to 10,000 individuals), and the species appears to be very fecund. The sites where the Madia minima populations occur are unique due to the number of other small annual species that are present.

Further surveys could reveal more populations of M. minima in the Bull River valley.

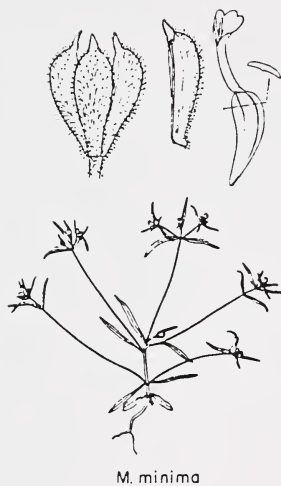
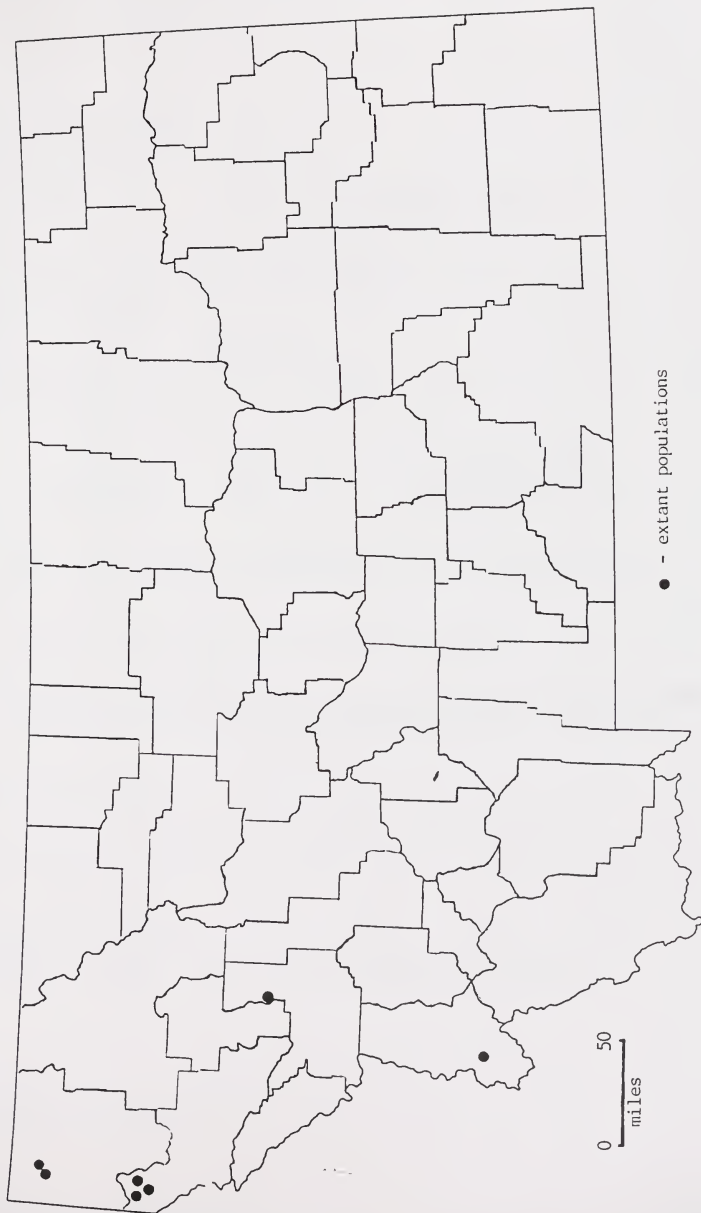


Figure 2. Line drawing Madia minima (from Hitchcock et al. 1955-1969).

Figure 3. Distribution of *Madia minima* in Montana.

Name: MADIA MINIMA
Common Name: SMALL-HEADED TARWEED

Global rank: G4 Forest Service status: NONE
State rank: S1 Federal Status: NONE

Element occurrence code: PDAST650C0.005

Survey site name: BULL RIVER CLIFFS
County: Sanders

USGS quadrangle: SMEADS BENCH

Township-range: 027N 033W Section: 24, N2
Township-range comments: Section: 13, SE4

Survey date: 1988-07-11	Elevation: 3000
First observation: 1988	Slope/aspect: -
Last observation: 1989-06-21	Size (acres): 40

Location:

BULL RIVER DRAINAGE, NORTHWEST OF STATE HIGHWAY 56, 5.2
MILES NORTHEAST OF STATE HIGHWAY 200.

Element occurrence data:

10,000+ PLANTS IN SCATTERED SUBPOPULATIONS.

General site description:

ROCKY, MOSS-COVERED CLIFFS, WET IN SPRING BUT DRY BY SUMMER;
WITH SELAGINELLA WALLACEI, CLARKIA PULCHELLA, EPILOBIUM
PANICULATUM AND MADIA EXIGUA.

Land owner/manager:

KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:

VOUCHER - SHELLY, J.S. (1544) AND L.A. SCHASSBERGER, 1989,
(MONTU).

Information source:

SHELLY, J.S., AND L.A. SCHASSBERGER. MONTANA NATURAL
HERITAGE PROGRAM. 1515 E. 6TH AVE. HELENA, MT 59620.

Name: MADIA MINIMA
Common Name: SMALL-HEADED TARWEED

Global rank: G4 Forest Service status: NONE
State rank: S1 Federal Status: NONE

Element occurrence code: PDAST650C0.006

Survey site name: DRY BENCH
County: Sanders

USGS quadrangle: SAWTOOTH MOUNTAIN

Township-range: 028N 033W Section: 29, NW4
Township-range comments: Section: 30, NE4

Survey date: 1989-06-21	Elevation: 3600
First observation: 1989	Slope/aspect: 8-15% / EAST
Last observation: 1989-06-21	Size (acres): 10

Location:
BULL RIVER VALLEY; CA. 3.25 MILES SOUTH OF BULL LAKE, CA.
0.75 MILES WEST OF ST. HWY. 56.

Element occurrence data:
COMMON ON SUITABLE SITES.

General site description:
MOIST OPEN SOIL TO MOSSY LEDGES WHERE MOISTURE IS HIGH; IN
FULL SUN LOCATIONS. ASSOCIATED SPECIES MADIA EXIGUA,
COLLINSIA PARVIFLORA AND MIMULUS BREWERI.

Land owner/manager:
KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:
VOUCHER - SHELLY, J.S. (1528) AND L.A. SCHASSBERGER. 1989.
(MONTU).

Information source:
SHELLY, J.S., AND L.A. SCHASSBERGER. MONTANA NATURAL
HERITAGE PROGRAM. 1515 E. 6TH AVE. HELENA, MT 59620.

Name: MADIA MINIMA
Common Name: SMALL-HEADED TARWEED

Global rank: G4 Forest Service status: NONE
State rank: S1 Federal Status: NONE

Element occurrence code: PDAST650C0.007

Survey site name: GOAT ROCKS
County: Sanders

USGS quadrangle: SNOWSHOE PEAK

Township-range: 028N 032W Section: 33
Township-range comments: SE4

Survey date: 1989-06-22	Elevation: 3500
First observation: 1989	Slope/aspect: 35%+ / SE
Last observation: 1989-06-22	Size (acres): 2

Location:

CABINET MOUNTAINS, GOAT ROCKS, NORTH FORK EAST FORK BULL
RIVER, 0.54 AIR MILES NORTH OF KOOTENAI N.F. RD. 407 BRIDGE
OVER THE NORTH FORK EAST FORK.

Element occurrence data:

SEVERAL COLONIES OBSERVED, CA. 400-500 PLANTS.

General site description:

OPEN, MOSSY LEDGES IN MONTANE GRASSLAND, LOAM SOILS; WITH
CALAMAGROSTIS RUBESCENS, CLARKIA PULCHELLA, SELAGINELLA
WALLACEI, FESTUCA IDAHOENSIS, AND PENSTEMON LYALLII.

Land owner/manager:

KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:

VOUCHER - SCHASSBERGER, L.A. (279) AND J.S. SHELLY, 1989,
(MONTU).

Information source:

SHELLY, J.S. 1989. FIELD SURVEYS IN THE BULL RIVER VALLEY,
19-23 JUNE.

Heterocodon rariflorum

I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Heterocodon rariflorum Nutt.
2. COMMON NAME: western pearl-flower.
3. FAMILY: Campanulaceae (Bellflower Family).
4. GENUS: The relationship of the genus Heterocodon to others in the Campanulaceae is uncertain. McVaugh (1941) transferred Heterocodon to the genus Specularia, but later split the group into Triodanis and Specularia (Legousia), reinstating the genus Heterocodon. Shetler and Morin (1986) feel that the seed morphology and the production of cleistogamous and chasmogamous flowers in the genus Heterocodon indicates a relation between it and the Legousia-Triodanis complex.
5. SPECIES: Heterocodon rariflorum is the only species known from this genus. Other synonyms include Specularia rariflora McVaugh, Leaflet. West. Bot. 3:48. 1941. (Nuttall, "grassy plains of the Wahlamet and Oregon") (Hitchcock et al. 1955-1969).

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS

- a. U.S. FISH AND WILDLIFE SERVICE: None.
- b. U.S. FOREST SERVICE: None.

2. STATE: Heterocodon rariflorum is currently listed by the Montana Natural Heritage Program (Shelly 1989) as demonstrably secure globally (global rank = G5). In Montana, it is listed as "critically imperiled because of extreme rarity" (state rank = S1). These populations are at the periphery of the main range of the species, which lies to the west.

None of the state ranks listed above currently provide any direct legal protection for H. rariflorum.

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** This small, slender annual is usually less than 12 (18) inches tall. The herbage may be smooth to somewhat sparsely stiff-hairy, especially at the margins of the leaves and angles of the stem. Distinctive sharply toothed, roundish leaves, with squared off bottoms, clasp the stem alternately at short intervals. Tiny, blue, five-lobed flowers are found in the leaf axils, but most are early deciduous.
2. **TECHNICAL DESCRIPTION:** Lax, very slender, simple or sparingly branched annual, commonly 0.5-3 dm. tall; herbage glabrous, or not infrequently hispid on the margins of the leaves and angles of the stem; leaves somewhat clasping, distant, rotund or rotund-ovate, sharply toothed, small, seldom as much as 1 cm. long; calyx divided to the hypanthium, the lobes foliaceous, veiny, ovate or broader, 2-4 mm. long; corollas of the upper flowers blue, 3-6 mm. long, the others abortive; hypanthium commonly spreading-hispid (Hitchcock et al. 1955-1969).
3. **LOCAL FIELD CHARACTERS:** This tiny annual is distinguished by rotund, toothed leaves, which are abruptly squared off along the bottom where they clasp the stem. A line drawing of H. rariflorum is presented in Figure 4, p. 33.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** Heterocodon rariflorum populations range from southern British Columbia to California, east to Nevada, Idaho, Wyoming, and Montana.

In Montana, where this species is on the periphery of its range, it is known from the Bull River valley, Sanders County (2), from the Bitterroot Mountains, Ravalli County (1), and from one historical record in Lake County. A map indicating the distribution of this species in Montana is presented on p. 34.

Information on the surveys of populations in the Bull River valley is presented on pp. 35-36 (Element Occurrence records). The location of each population is marked on U.S.G.S. maps, pp. 37-38.

E. HABITAT

1. **ASSOCIATED VEGETATION:** Species found in association with H. rariflorum (at one or more sites) included:

Clarkia pulchella (ragged robin)
Madia exigua (little tarweed)
Madia minima (small head tarweed)
Mimulus floribundus (purple-stem monkey-flower)
Myosotis micrantha (blue scorpion-grass)
Selaginella wallacei (Wallace selaginella)

2. **TOPOGRAPHY:** This species occurs on steep slopes in the Bull River valley.
3. **SOIL RELATIONSHIPS:** Heterocodon rariflorum was found in areas with less dense vegetation, and it is possible that it requires bare soil for seedling establishment.
4. **REGIONAL CLIMATE:** The mountains of northwestern Montana are dominated by a cool temperate climate. The weather collection site at Trout Creek Ranger Station is approximately 15 miles east of the Bull River valley, and at an elevation of 2,370 feet. The H. rariflorum sites are at 4,000 to 4,700 feet in elevation. For the period from 1951-1980, the July mean temperature at Trout Creek Ranger Station was 65.0° F, the January mean was 24.1° F, and the mean annual precipitation was 30.49 inches (U.S. Department of Commerce 1982).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** Heterocodon rariflorum flowers and fruits from June through August (Hitchcock et al. 1955-1969). In the Bull River valley of Montana, this species had finished flowering by the end of June, and may have begun to flower in late May.
2. **POPULATION SIZE AND CONDITION:** This species occurs in small colonies in the Bull River valley. Observed populations were in good condition, although some weedy species were present.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** This annual species reproduces by seed.

b. POLLINATION BIOLOGY: Unknown.

c. SEED DISPERSAL AND BIOLOGY: Unknown.

G. POPULATION ECOLOGY

1. BIOLOGICAL INTERACTIONS

a. COMPETITION: This small annual was found in somewhat barren soils, and it is possible that it does not compete well.

b. HERBIVORY: Unknown.

H. LAND OWNERSHIP

1. U.S. Forest Service - Kaniksu National Forest, managed by the Kootenai National Forest:

Dry Bench (001)
Bull River Cliffs (002)

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS:

1. GRAZING: Not observed and unlikely in its native habitat in the Bull River valley.
2. MINING: Unknown.
3. TIMBER HARVESTING: Although H. rariflorum appears to require bare soil for germination, it is not known how it would respond to timber harvests.
4. WEED CONTROL ACTIVITIES: Spraying of H. rariflorum populations would be detrimental unless they had gone to seed.

B. MANAGEMENT PRACTICES AND RESPONSE: Unknown.

C. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS:

The locations of the known populations on the Kootenai National Forest are in areas that are unlikely to be affected by most management practices, and the populations are probably self-maintaining.

- D. RECOMMENDATIONS FOR FURTHER ASSESSMENT: There is additional habitat along the Bull River drainage that might potentially contain populations of H. rariflorum.

- E. **SUMMARY:** During rare plant surveys of the Bull River valley in 1989, two populations of Heterocodon rariflorum were found on Kootenai National Forest lands, Sanders County, Montana. The Dry Bench (001) and Bull River Cliffs (002) populations are located on the hillsides that flank the Bull River. Heterocodon rariflorum individuals are found in small colonies, and occur in association with a number of other small annual species.

Further surveys may reveal more populations of H. rariflorum in the Bull River valley.



Heterocodon rariflorum

Figure 4. Line drawing *Heterocodon rariflorum* (from Hitchcock et al. 1955-1969).

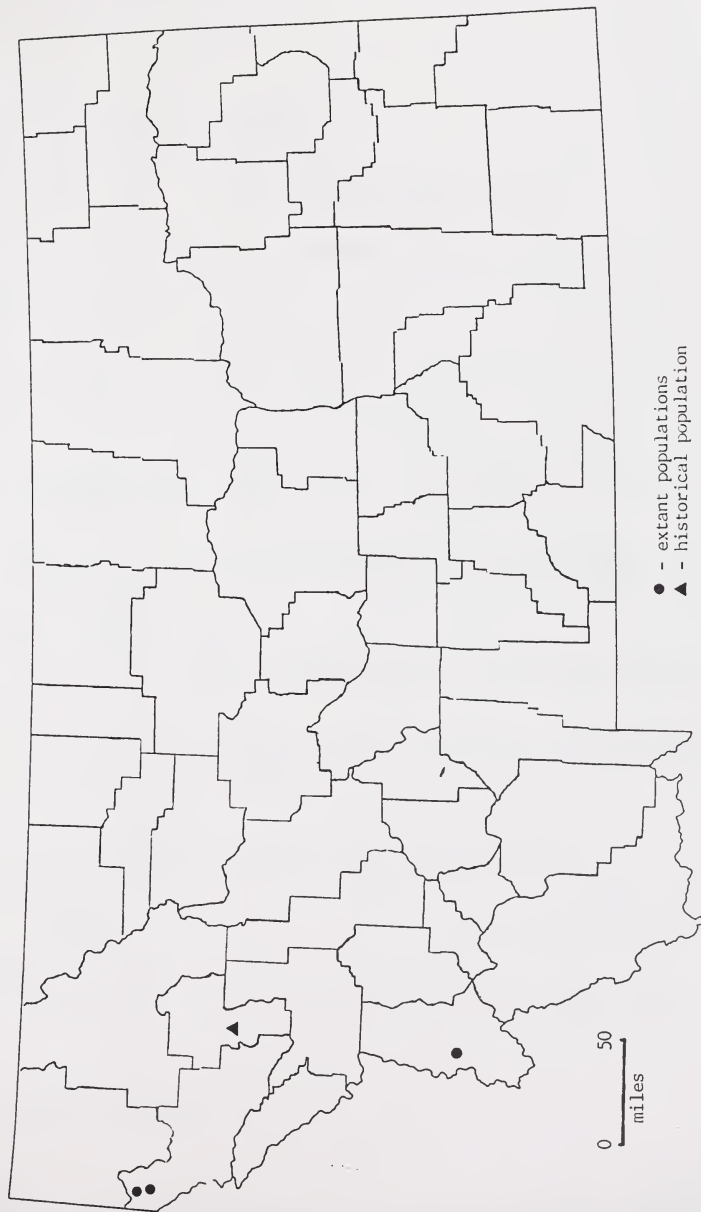


Figure 5. Distribution of Heterocodon rariflorum in Montana.

Name: HETEROCODON RARIFLORUM
Common Name: WESTERN PEARL-FLOWER

Global rank: G5 Forest Service status: NONE
State rank: S1 Federal Status: NONE

Element occurrence code: PDCAM08010.001

Survey site name: DRY BENCH
County: Sanders

USGS quadrangle: SAWTOOTH MOUNTAIN

Township-range: 028N 033W Section: 29, NW4
Township-range comments: Section: 30, NE4

Survey date: 1989-06-20	Elevation: 3100
First observation: 1989	Slope/aspect: 30-40% / SE
Last observation: 1989-06-20	Size (acres): 5

Location:

BULL RIVER VALLEY, CA. 3.25 MILES SOUTH OF BULL LAKE, CA.
0.75 MILES WEST OF ST. HWY. 56; SLOPE BELOW DRY BENCH, NORTH
OF DRY CREEK.

Element occurrence data:

SPECIES IS AN ANNUAL, OCCURRING IN SMALL COLONIES; FULL
EXTENT OF POPULATION CURRENTLY UNKNOWN; SOME WEED INVASION.

General site description:

MOSSY LEDGES AND OPEN SOIL AREAS, ON STEEP, SOUTHEAST-FACING
SLOPE; WITH MADIA MINIMA, MADIA EXIGUA, CLARKIA PULCHELLA,
AND SELAGINELLA WALLACEI.

Land owner/manager:

KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:

VOUCHER - SHELLY, J.S. (1534A) AND L.A. SCHASSBERGER, 1989,
(MONTU).

Information source:

SHELLY, J.S. 1989. FIELD SURVEYS IN THE BULL RIVER VALLEY,
19-23 JUNE.

Name: HETEROCODON RARIFLORUM
Common Name: WESTERN PEARL-FLOWER

Global rank: G5 Forest Service status: NONE
State rank: S1 Federal Status: NONE

Element occurrence code: PDCAM08010.002

Survey site name: BULL RIVER CLIFFS
County: Sanders

USGS quadrangle: SMEADS BENCH

Township-range: 027N 033W Section: 24, NE4
Township-range comments: Section: 13, SE4

Survey date: 1989-06-21	Elevation: 2750
First observation: 1989	Slope/aspect: 30-40% / SE
Last observation: 1989-06-21	Size (acres): 10

Location:

BULL RIVER DRAINAGE, NORTHWEST OF STATE HIGHWAY 56, 5.2
MILES NORTHEAST OF STATE HIGHWAY 200.

Element occurrence data:

SPECIES IS AN ANNUAL, OCCURRING IN SMALL COLONIES; FULL
EXTENT OF POPULATION CURRENTLY UNKNOWN; SOME WEED INVASION.

General site description:

MOSSY LEDGES AND OPEN SOIL AREAS, ON STEEP TO MODERATE
SOUTHEAST-FACING SLOPE; WITH MADIA MINIMA, CLARKIA
PULCHELLA, MIMULUS FLORIBUNDUS, AND MYOSOTIS MICRANTHA.

Land owner/manager:

KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:

VOUCHER - SHELLY, J.S. (1538) AND L.A. SCHASSBERGER, 1989,
(MONTU).

Information source:

SHELLY, J.S. 1989. FIELD SURVEYS IN THE BULL RIVER VALLEY,
19-23 JUNE.

Spiraea x pyramidata

I. SPECIES INFORMATION

A. CLASSIFICATION

1. SCIENTIFIC NAME: Spiraea x pyramidata Greene.
2. COMMON NAME: pyramidal spiraea.
3. FAMILY: Rosaceae (Rose Family).
4. GENUS: According to Hitchcock et al. (1955-1969), there are about 70 species in the genus Spiraea. These species occur primarily in the temperate zone of the Northern Hemisphere. Dorn (1984) recognized only three species within the state of Montana, and did not include S. x pyramidata in his treatment.
5. SPECIES: Spiraea x pyramidata has been described as the putative hybrid of a number of different species in past. The most recent study of this taxon supports the theory that the suspected parents are S. betulifolia var. lucida and S. douglasii (Hess 1969). Other synonyms for this species include S. menziesii Hook. ssp. pyramidata Piper and S. tomentulosa Rydb. (Hitchcock et al. 1955-1969).

B. PRESENT LEGAL OR OTHER FORMAL STATUS

1. FEDERAL STATUS
a. U.S. FISH AND WILDLIFE SERVICE: None.
b. U.S. FOREST SERVICE: None.
2. STATE: Spiraea x pyramidata is currently listed by the Montana Natural Heritage Program (Shelly 1989) as "apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery" (global rank = G3G4). In Montana, it is listed as "critically imperiled because of extreme rarity" (state rank = S1).

None of the state ranks listed above currently provide any direct legal protection for S. x pyramidata.

C. DESCRIPTION

1. **GENERAL NONTECHNICAL DESCRIPTION:** *Spiraea x pyramidata* is a low shrub in the Rose Family that may reach four feet in height, but is usually shorter. Oblong-shaped leaves which have coarse teeth towards the tip occur alternately along the stem. Additionally, the leaves and the upper stems are usually crisply short-hairy. The characteristic light pink flowers are crowded into large inflorescences, which are broadly hemispheric in shape. These inflorescences are also crisply short-hairy.
2. **TECHNICAL DESCRIPTION:** Rhizomatous, spreading to erect shrub mostly 5-10 (12) dm. tall, usually finely crisp-pubescent above and in the inflorescence, the leaves from glabrous to (more commonly) slightly to moderately crisp-puberulent at least beneath, ovate-lanceolate to oblong-elliptic or oblong-lanceolate, 2-7 (9) cm. long, from subentire to coarsely once or twice serrate chiefly above the middle; panicle usually large, from rounded to obconic, (2) 5-10 cm. broad, and 1-2 times as long; calyx usually sparsely hairy without, the triangular lobes scarcely 1 mm. long, reflexed, about equaling the conic-hemispheric hypanthium; petals white but with a distinct pinkish or lavender tinge (at least in the bud), (1.5) 2-2.5 mm. long; carpels glabrous to somewhat pubescent, 2.5-3 mm. long (Hitchcock et al. 1955-1969).
3. **LOCAL FIELD CHARACTERS:** *Spiraea x pyramidata* most closely resembles *S. betulifolia* in stature and inflorescence shape. However, in the former the inflorescence is more hemispheric in shape, and the flowers are distinctly light pink in color, while the latter has a broad flat inflorescence with cream-colored flowers. *Spiraea douglasii* is generally a much taller, more freely branching shrub than *S. x pyramidata*. *Spiraea douglasii* is also distinguished by its pink to rose-colored flower petals, which are borne in inflorescences that are several times longer than wide. Finally, *Spiraea x pyramidata* is primarily associated with disturbed habitats. Line drawings of all three taxa are included on p. 45.

D. GEOGRAPHICAL DISTRIBUTION

1. **RANGE:** The range of *S. x pyramidata* extends from

British Columbia to northern Oregon along the east side of the Cascade Mountains, and then east into Saskatchewan, Idaho, Montana, Wyoming, and South Dakota (Hess 1969). In Montana, this species is known from one site each in Lincoln, and Sanders counties, and two sites in Missoula County, in northwestern Montana. The distribution of this taxon in Montana is presented in Figure 7, p. 46.

2. **CURRENT SITES:** The Bull River Campground (001) location was first observed in 1986 and again during survey work in 1989; it is the only recently verified location for S. x pyramidata in Montana. The other locations along Pete Creek (002), East Fork Lolo Creek (003), and Lolo Creek (004) were last verified in 1965, 1970, and 1937, respectively.
3. **UNVERIFIED/UNDOCUMENTED REPORTS:** None at present.

E. HABITAT

1. **ASSOCIATED VEGETATION:** The Spiraea x pyramidata population at Bull River Campground (001) occurs in a powerline corridor adjacent to the campground. A disturbed habitat is typical of this taxon (Hess 1969). Other species occurring at this site include the disturbance-related Pteridium aquilinum and S. betulifolia, as well as Rubus parviflorus, Aralia nudicaulis and Rosa woodsii. S. douglassii occurs nearby along the Bull River and in shaded areas in the campground.
2. **TOPOGRAPHY:** Spiraea x pyramidata populations are most commonly found in valley bottoms (Hitchcock et al. 1955-1969), in areas with low relief. The microsites where this species occurs are usually somewhat dry and sandy (Hess 1969).

The population at Bull River Campground (001) is at 2,300 feet in elevation, and is found in dry soils on a 10 percent slope; it is less than one quarter mile from the Bull River.

3. **SOIL RELATIONSHIPS:** Hess (1969) states that S. x pyramidata is "almost always found on disturbed areas such as roadsides, highways, railways, forest camps, and homesites," with either or both suspected parent also present. This indicates that the species appears to require mineral soil for establishment. It is possible that, like

other hybrids, the habitat requirements of S. x pyramidata fall between those of the suspected parental types (Ball et al. 1983).

4. **REGIONAL CLIMATE:** The mountains of northwestern Montana are dominated by a cool temperate climate. The weather collection site at Trout Creek Ranger Station is approximately 15 miles east of the Bull River valley, and at an elevation of 2,370 feet. The S. x pyramidata site is at 2,300 feet in elevation. For the period from 1951-1980, the July mean temperature at Trout Creek Ranger Station was 65.0° F, the January mean was 24.1° F, and the mean annual precipitation was 30.49 inches (U.S. Department of Commerce 1982).

F. POPULATION DEMOGRAPHY AND BIOLOGY

1. **PHENOLOGY:** The Bull River Campground (001) population flowers during late July. Hitchcock et al. (1955-1969) state that flowering and fruiting in S. x pyramidata populations occurs from June through August.
2. **POPULATION SIZE AND CONDITION:** The observed number of stems at Bull River Campground was low (three), but the plants appeared to be in good condition.
3. **REPRODUCTIVE BIOLOGY**
 - a. **TYPE OF REPRODUCTION:** Specific aspects of sexual reproduction are not known. Observations of populations in Washington and British Columbia revealed only one population where introgression and backcrossing had occurred. Reasons for the degree of sterility with the putative parental types are not known. This perennial does spread easily via a strong rhizome system (Hess 1969).
 - b. **POLLINATION BIOLOGY:** Not known.
 - c. **SEED DISPERSAL AND BIOLOGY:** Not known.

G. POPULATION ECOLOGY

1. **BIOLOGICAL INTERACTIONS**
 - a. **COMPETITION:** The establishment of this species appears to depend on disturbance. It

is possible that S. x pyramidata requires open, mineral soils for seed germination.

b. HERBIVORY: Unknown.

H. LAND OWNERSHIP

1. Bull River Campground (001) - Kaniksu National Forest, managed by the Kootenai National Forest.

II. ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

A. THREATS TO CURRENTLY KNOWN POPULATIONS

1. GRAZING: Grazing does not appear to be a threat at Bull River Campground (001), although this species may be browsed by large herbivores.
2. MINING: Not known.
3. TIMBER HARVESTING: At Bull River Campground the S. x pyramidata population has become established where the overstory has been removed for a powerline corridor. In areas where both parental types are present, this type of disturbance may actually aid in the establishment of S. x pyramidata populations.
4. WEED CONTROL ACTIVITIES: None known.

B. RECOMMENDATIONS FOR MAINTAINING VIABLE POPULATIONS: The Bull River Campground S. x pyramidata population is established in a powerline corridor. Clearing of undergrowth along the corridor appears to occur at regular intervals, and may be beneficial in maintaining habitat for this population.

C. RECOMMENDATIONS FOR FURTHER ASSESSMENT: The potential habitat for S. x pyramidata is extensive (a powerline corridor extends from Plains, Montana, west to at least the Montana/Idaho border along the lower Clark Fork), and further surveys may reveal more populations.

D. SUMMARY: A population of Spiraea x pyramidata at Bull River Campground (001) was revisited in 1989. Only three individuals were observed; however, it is not easily discernible from its putative parental type S. betulifolia var. lucida in the vegetative state, and it is possible that more stems were actually present. Both putative parental types (S. douglasii and S. betulifolia var. lucida) were present, and episodes of hybridization may continue. Much potential habitat for

S. x pyramidata exists in this area of northwest Montana, and further surveys may reveal more populations.



Spiraea pyramidata



Spiraea betulifolia

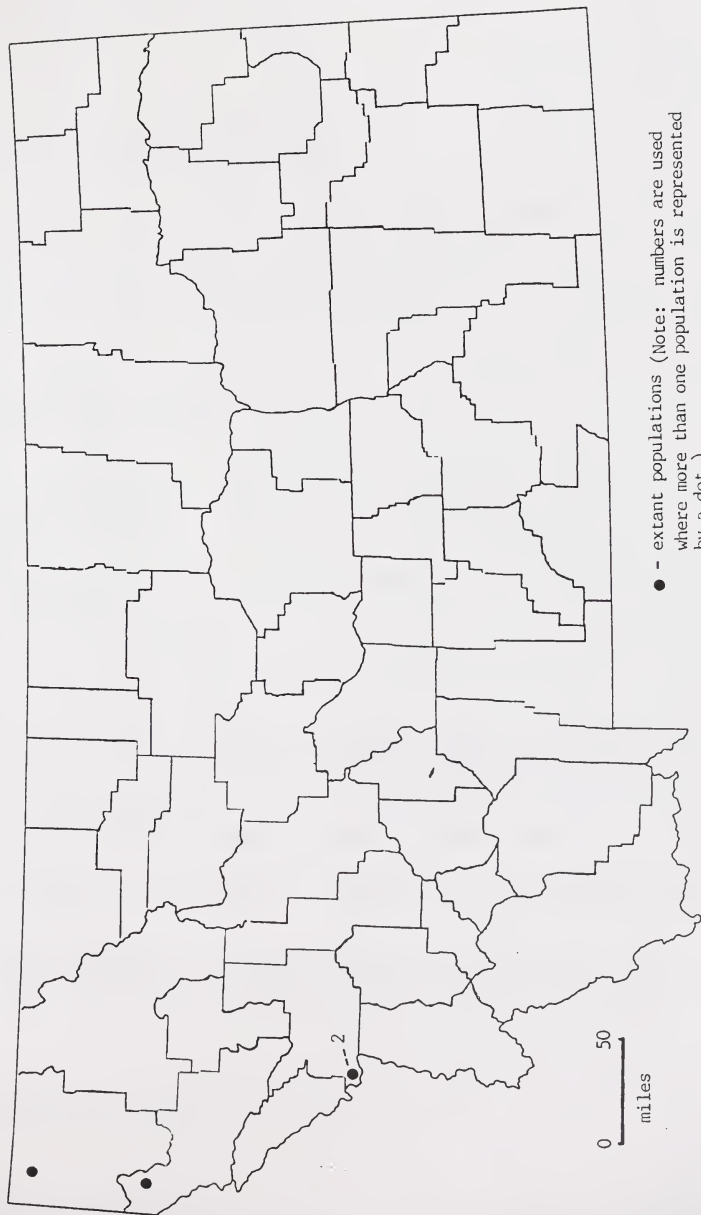


Spiraea douglasii

JRJ

Figure 6.

Line drawing of *Spiraea* x *pyramidata* and the putative parental types, *Spiraea betulifolia* and *Spiraea douglasii* (from Hitchcock *et al.* 1955-1969).

Figure 7. Distribution of Spiraea x pyramidata in Montana.

Name: SPIRAEA x PYRAMIDATA
Common Name: PYRAMIDAL SPIRAEA

Global rank: G3G4 Forest Service status: NONE
State rank: S1 Federal Status: NONE

Element occurrence code: PDROS1Q0J0.001

Survey site name: BULL RIVER CAMPGROUND
County: Sanders

USGS quadrangle: SMEADS BENCH

Township-range: 026N033W Section: 10
Township-range comments: N2

Survey date:	1989-07-25	Elevation:	2300
First observation:	1986	Slope/aspect:	
Last observation:	1989-07-25	Size (acres):	0

Location:

NOXON RESERVOIR, BULL RIVER CAMPGROUND, TO THE NORTH OF THE CAMPSITES.

Element occurrence data:

FLOWERS LIGHT PINK; 3 PLANTS IN FLOWER (1989).

General site description:

BENEATH EDGE OF FOREST CANOPY ALONG POWERLINE CORRIDOR, WITH RUBUS PARVIFLORUS, ARALIA NUDICAULIS, ROSA WOODSII, AND SPIRAEA BETULIFOLIA. S. DOUGLASII OCCURS NEAR THE RIVER.

Land owner/manager:

KOOTENAI NATIONAL FOREST, CABINET RANGER DISTRICT

Comments:

VOUCHER - LACKSCHEWITZ, K. (10909), 1986, SPECIMEN # 103731 (MONTU).

Information source:

SCHASSBERGER, L.A. MONTANA NATURAL HERITAGE PROGRAM, 1515 EAST SIXTH AVENUE, HELENA, MT 59620. (329). 1989. MONTU.

SIGNIFICANT HABITATS

A. OPEN SLOPE/LEDGE COMMUNITIES

On low to middle-elevation slopes, especially along the western side of the Bull River drainage, there occurs a series of open habitats supporting interesting assemblages of plant species. These areas are characterized by a moist, mossy ground cover, and occur on sloping ledges and benches. These sites are moist early in the growing season, after snowmelt and during spring rains, but become dry by late summer. The diverse flora contains numerous spring/early summer annuals, including:

Clarkia pulchella
Collinsia parviflora
Collomia linearis
 *Heterocodon rariflorum
Madia exilqua
 *Madia minima
Microsteris gracilis
Mimulus breweri
Mimulus floribundus
Myosotis micrantha

(* = MTNHP plant species of special concern)

The substrates in these open areas are fragile, consisting of an often closed cover of mosses and similar vascular plants (especially Selaginella wallacei). Such sites would be vulnerable to impacts from livestock grazing and/or road construction, but generally occur on steep, largely inaccessible terrain that does not appear to be threatened or impacted at this time.

The sites of this type that were studied in detail include:

- a. T28N, R32W, Section 33 (east flank of Goat Rocks, North Fork East Fork Bull River drainage).
- b. T28N, R33W, Sec. 29 NW $\frac{1}{4}$ and 30 NE $\frac{1}{4}$ (Dry Bench).
- c. T27N, R33W, Sec. 24 N $\frac{1}{2}$ and 13 SE $\frac{1}{4}$ ("Bull River Cliffs" site).

Additional similar habitats were observed during field surveys, but not all of them could be studied during 1989.

B. WETLANDS

The narrow valley bottom along the Bull River contains a mosaic of low elevation forests and numerous wetlands. The majority of the open, moist to wet areas have been converted to

hay meadows and pastures, and many of them are completely dominated by Phalaris arundinacea (reed canary grass). This grass species is frequently introduced as a constituent of permanent pastures, and is often cut for hay (Hitchcock et al. 1955-1969); it has undoubtedly supplanted native vegetation in many areas along the drainage. However, three wetlands in the drainage that are currently in good to excellent condition were surveyed in detail. Notes on condition and dominant species are given below:

- a. T28N, R33W, Sec. 9, E4: This area comprises the largest contiguous intact wetland complex in the Bull River drainage. The southern half of the wetland was partially influenced by past beaver activity, and is characterized by a high water table with numerous areas of marshy ground or open water. The vegetation is dominated by Carex rostrata (beaked sedge) and Carex aquatilis (water sedge). The northern portion of this wetland is slightly higher in elevation, and the water table is at or just below the substrate surface; it is dominated almost exclusively by Carex lasiocarpa (slender sedge).

The current Kootenai National Forest map shows this wetland to be under the ownership of Champion International, Inc.. Adjacent uplands, on Champion lands north and east of the wetland, have been clear-cut logged, but the wetland complex itself is currently intact.

- b. T27N, R33W, Sec. 11, SW4: This wetland, adjacent to the southernmost Highway 56 bridge over the Bull River, consists of large marshes on the west and east sides of an open freshwater lake. These marshes are dominated by Carex lasiocarpa (slender sedge), and are bordered by a Spiraea douglasii (Douglas spiraea) "hedge"; the adjacent forest margin contains Pinus monticola (western white pine) and Larix occidentalis (western larch). Small areas of floating sphagnum moss mats are present along the western edge of the lake margin, and support a population of Drosera rotundifolia (round-leaved sundew), a carnivorous plant adapted to such acidic, nutrient-poor habitats. Dulichium arundinaceum was also found in this same habitat. The lake has a soft, muddy bottom and contains Nuphar variegatum (yellow water-lily).

This site is partially privately owned, but the lake is on Kootenai National Forest lands. Better-drained areas to the northwest, especially meadows, have been seriously impacted by the invasion of Centaurea

maculosa (spotted knapweed), but the wetlands remain in a pristine condition.

- c. T27N, R33W, Sec. 26, E $\frac{1}{2}$ NE $\frac{1}{4}$: A small wetland, on the northwest side of Highway 56 ca. 3.6 miles northeast of Highway 200, was surveyed. This marshy area is relatively shallow (0.3-1.0 m deep), and may be largely dried out by the end of the growing season. The site appeared to be suitable habitat for Howellia aquatilis (water howellia), a USFWS Category 2 federal candidate and U.S. Forest Service Region 1 sensitive species, but this species was not found. The vegetation is dominated by Carex rostrata and Equisetum fluviatile (water horsetail).

This wetland is largely or wholly in private ownership. Despite its proximity to the highway, it is currently in good condition.

SUMMARY

This report contains information on a rare plant inventory conducted in portions of the Bull River valley. Field surveys were completed on 19-23 June and 24-28 July 1989. During survey work four species of special concern were located: Lomatium bicolor var. bicolor (1 population), Madia minima (3 populations), Heterocodon rariflorum (2 populations), and Spiraea x pyramidata (1 population). These species are not currently included on the U.S. Forest Service Region 1 (Northern Region) list of sensitive species; however, they are included on the Montana Natural Heritage Program list of plant species of special concern. A report for each species, including detailed information on the populations found in the Bull River valley, is included. Voucher specimens of Madia minima, Heterocodon rariflorum, Lomatium bicolor var. bicolor, and Spiraea x pyramidata were deposited at the University of Montana Herbarium (MONTU), Missoula, MT. Additional specimens of Lomatium bicolor var. bicolor are deposited at the University of California Herbarium (UC), Berkeley, CA.

A list of 252 vascular plant species observed during this study is included at the end of the report.

A day and a half was spent surveying Forest Service lands on Rock Creek, Marten Creek, and the mouth of the Vermillion River for Satureja douglasii. This species is known to occur on private lands near Rock Creek, but is not yet known from U.S. Forest lands in the area. We were unable to locate this species on the private land where it was first observed, or on U.S. Forest Service lands. Many plants were late in flowering in 1989 due to the very cold winter and late, cold spring. Satureja douglasii may not have been blooming, in which case this unobtrusive plant could have been easily overlooked.

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VASCULAR PLANT SPECIES OBSERVED IN THE BULL RIVER DRAINAGE, SANDERS COUNTY, MONTANA, JUNE-JULY 1989

(Symbols represent locations of voucher specimens for marked taxa: * = University of Montana Herbarium, Missoula (MONTU); + = University of California Herbarium, Berkeley (UC); # = Gray Herbarium, Harvard University (GH)).

ACERACEAE (Maple Family)

Acer glabrum (mountain maple) Moist areas in forests or along streambanks.

APIACEAE (Carrot Family)

Cicuta douglasii (Douglas waterhemlock) Moist areas.
Heracleum sphondylium (cow parsnip) Riparian areas.
 *Lomatium ambiguum (swale desert parsley) Rocky areas.
 +*Lomatium bicolor var. bicolor (bicolor biscuitroot) Dry, rocky scree slopes.
 *Lomatium dissectum (fern-leaved lomatium) Rocky dry slopes.
 +Lomatium sandbergii (Sandberg's lomatium) Moist, rocky slopes.
Lomatium triternatum (narrowleaf lomatium) Dry slopes.
Osmorhiza chilensis (mountain sweet-root) Moist areas in shaded forests.
Sium suave (hemlock water-parsnip) Ponds and wetlands.

APOCYNACEAE (Dogbane Family)

Apocynum androsaemifolium (spreading dogbane) Dry gravelly open slopes.
Apocynum sibiricum (clasping-leaved dogbane) Dry gravelly open slopes.

ARALIACEAE (Ginseng Family)

Aralia nudicaulis (wild sarsaparilla) Moist woods and thickets.
Oplopanax horridus (devil's club) Moist woods.

ARISTOLOCHIACEAE (Birthwort Family)

Asarum caudatum (wild ginger) Moist woods, under forest canopy.

ASTERACEAE (Sunflower Family)

Achillea millefolium (common yarrow) Open or disturbed areas.
Adenocaulon bicolor (trail plant) Moist woods and meadows.
Agoseris heterophylla (annual agoseris) Hills and slopes.
Anaphalis margaritacea (common pearly everlasting) Woods, slopes and rocky flats.
 *Antennaria luzuloides (woodrush pussytoes) Open slopes.
Antennaria neglecta (field pussytoes) Open woods.
Antennaria microphylla (rosy pussytoes) Meadows and open woods.
Antennaria racemosa (raceme pussytoes) Woods.
 *Arnica diversifolia (sticky arnica) Rocky places on slopes.
 *Arnica fulgens (orange arnica) Hills, slopes, and meadows.
Arnica latifolia (broadleaf arnica) Moist woods.
Balsamorhiza sagittata (arrowleaf balsamroot) Dry open slopes.
Centaurea maculosa (spotted knapweed) Disturbed areas.
Chrysanthemum leucanthemum (oxeye-daisy) Disturbed areas.
Crepis elegans (elegant hawkbeard) Woods.
Erigeron compositus (cut-leaved daisy) Dry, rocky slopes.
Gnaphalium palustre (lowland cudweed) Moist woods.
Hieracium albiflorum (white hawkweed) Woods and slopes.
Hieracium aurantiacum (king devil) Disturbed areas.
Hieracium cynoglossoides (houndstounge hawkweed) Meadows and slopes.
Hieracium umbellatum (narrow-leaved hawkweed) Woods and thickets.
 *Madia exigua (little tarweed) Open woods.
 *Madia minima (small-headed tarweed) Open rocky areas in woods.
Senecio sphaerocephalus (mountain-marsh butterweed) Open moist slopes.
Senecio triangularis (arrowleaf groundsel) Moist meadows and slopes.
Tanacetum vulgare (common tansy) Disturbed areas.

BERBERIDACEAE (Barberry Family)

Mahonia repens (creeping oregongrape) Woods and slopes.

BETULACEAE (Birch Family)

Alnus viridis (Sitka alder) Woods, slopes and streambanks.
Betula papyrifera (paper birch) Moist woods.

BORAGINACEAE (Borage Family)

Cryptantha spp. (cryptantha) Disturbed area.
 *Myosotis micrantha (blue scorpion-grass) Open slopes.
Myosotis scorpioides (true-forget-me-not) Shallow water, wetlands.

BRASSICACEAE (Mustard Family)

Arabis holboellii (Holboell's rockcress) Mountain slopes.
Arabis lemmonii (Lemon's rockcress) Mountain slopes.
 #Arabis hirsuta var. glabra (hairy rockcress) Moist woods.

CAMPANULACEAE (Bellflower Family)

Campanula rotundifolia (lady's thimble) Woods and slopes.
 *Heterocodon pariflorum (heterocodon) Open slopes.

CAPRIFOLIACEAE (Honeysuckle Family)

Linnaea borealis (western twinflower) Woods.
Lonicera ciliosa (orange honeysuckle) Woods and thickets.
Lonicera involucrata (bearberry honeysuckle) Moist woods and thickets.
Lonicera utahensis (Utah honeysuckle) Wooded mountain slopes.
Sambucus racemosa (red elderberry) Woods and slopes.
Symphoricarpos albus (common snowberry) Woods and slopes.
Symphoricarpos occidentalis (western snowberry) Moist woods.

CARYOPHYLLACEAE (Pink Family)

Arenaria capillaris (fescue sandwort) Open areas in mountains.
Cerastium fontanum (common chickweed) Disturbed areas.
Silene parryi (Parry's silene) Open meadows in mountains.

CELASTRACEAE (Staff Tree Family)

Paxistima myrsinites (myrtle boxwood) Moist woods.

CORNACEAE (Dogwood Family)

Cornus canadensis (bunchberry) Moist woods.
Cornus stolonifera (red osier dogwood) Streambanks and moist areas.

CRASSULACEAE (Stonecrop Family)

Sedum lanceolatum (lance-leaved stonecrop) Rocky slopes.
 *Sedum stenopetalum (wormleaf stonecrop) Open slopes.

CUPRESSACEAE (Juniper Family)

Juniperus communis (common juniper) Rocky slopes.
Thuja plicata (western red cedar) Moist woods.

CYPERACEAE (Sedge Family)

Carex aquatilis (water sedge) In ponds and wetlands.
 *Carex canescens (pale sedge) Wetlands.
Carex deweyana (Dewey's sedge) Wetlands.
Carex flava (yellow sedge) Wetlands.
Carex geveii (elk sedge) Woods and meadows.
 *Carex lenticularis (lentil-fruit sedge) Wetlands.

* <u>Carex leptalea</u> (bristle-stalked sedge)	Wet areas.
* <u>Carex mertensii</u> (Merten's sedge)	Wetlands.
<u>Carex rostrata</u> (beaked sedge)	Wetlands.
<u>Carex stipata</u> (sawbeak sedge)	Wetlands.
<u>Carex vesicaria</u> (inflated sedge)	Wetlands.
<u>Dulichium arundinaceum</u> (dulichium)	Wetlands.
<u>Eleocharis palustris</u> (common spikesedge)	Wetlands.
<u>Scirpus americanus</u> (American bulrush)	Wetlands.

DROSERACEAE (Sundew Family)

<u>Drosera rotundifolia</u> (roundleaf sundew)	Edges of wetlands on floating sphagnum.
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ELAEAGNACEAE (Oleaster Family)

<u>Shepherdia canadensis</u> (Canada buffalo-berry)	Open slopes.
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EQUISETACEAE (Horsetail Family)

<u>Equisetum arvense</u> (field horsetail)	Moist edges of wetlands.
<u>Equisetum fluviatile</u> (water horsetail)	Wetlands.

ERICACEAE (Heath Family)

<u>Arctostaphylos uva-ursi</u> (kinnikinnick)	Woods and slopes.
<u>Chimaphila menziesii</u> (little prince's pine)	Woods.
<u>Chimaphila umbellata</u> (common prince's pine)	Woods.
* <u>Gaultheria ovatifolia</u> (slender wintergreen)	Valley bottoms in cedar/hemlock forests.
<u>Menziesia ferruginea</u> (fool's huckleberry)	Woods.
<u>Moneses uniflora</u> (woodnymph)	Woods.
<u>Pterospora andromedea</u> (woodland pinedrops)	Conifer forests.
<u>Pyrola asarifolia</u> (pink wintergreen)	Mountain woodlands.
<u>Pyrola chlorantha</u> (green wintergreen)	Mountain woodlands.
<u>Vaccinium globulare</u> (globe huckleberry)	Wooded slopes.
<u>Vaccinium scoparium</u> (grouse whortleberry)	Higher elevation wooded slopes.

FABACEAE (Pea Family)

<u>Lupinus sericeus</u> (silky lupine)	Open slopes.
<u>Medicago lupulina</u> (black medic)	Disturbed areas.
<u>Trifolium pratense</u> (red clover)	Disturbed areas.
<u>Vicia americana</u> (American vetch)	Wooded slopes.

GROSSULARIACEAE (Currant Family)

<u>Ribes lacustre</u> (prickly currant)	Woods.
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HYDROPHYLLACEAE (Waterleaf Family)

* <u>Phacelia hastata</u> (silverleaf phacelia)	Open areas on slopes.
<u>Phacelia sericea</u> (silky phacelia)	Rocky dry areas.

HYPERICACEAE (St. John's-wort Family)

<u>Hypericum perforatum</u> (Klamath weed)	Disturbed areas.
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JUNCACEAE (Rush Family)

<u>Juncus bufonius</u> (toad rush)	Moist woods and wetland edges.
<u>Juncus confusus</u> (Colorado rush)	Open areas in moist woods.
<u>Juncus tenuis</u> (slender rush)	Open areas moist woods.
<u>Luzula arcuata</u> (curved woodrush)	Higher mountains.
* <u>Luzula campestris</u> (field woodrush)	Moist areas.

LAMIACEAE (Mint Family)

<u>Lycopus uniflorus</u> (northern bugleweed)	Moist areas.
<u>Mentha arvensis</u> (field mint)	Moist areas.
<u>Prunella vulgaris</u> (self-heal)	Moist meadows and disturbed areas.

Scutellaria galericulata (marsh scullcap)

Wetlands.

LILIACEAE (Lily Family)

Calochortus apiculatus (pointed mariposa)

Woods and slopes.

Camassia quamash (common camas)

Moist meadow seep areas.

Clintonia uniflora (queencup beadle)

Forests.

Erythronium grandiflorum (glacier-lily)

Woods, slopes and meadows.

Smilacina racemosa (false spikenard)

Woods.

Smilacina stellata (starry solomon-plume)

Woods.

*Stenanthium occidentale (western stenanthium)

Moist rocky areas.

Trillium ovatum (white wake-robin)

Woods.

Trileleia grandiflora (large-flowered brodiaea)

Open woods.

Xerophyllum tenax (beargrass)

Higher elevation woods.

Zygadenus elegans (death-camas)

Moist open areas and meadows.

LYCOPODIACEAE (Club Moss Family)

Lycopodium complanatum (ground cedar)

Moist woods.

MENYANTHACEAE (Buck Bean Family)

Menyanthes trifoliata (buckbean)

Ponds and bogs.

NYMPHAEACEAE (Water Lily Family)

Nuphar variegatum (yellow water-lily)

Ponds.

ONAGRACEAE (Evening Primrose Family)

*Circaea alpina (enchanter's nightshade)

Moist seeps in shaded areas.

*Clarkia pulchella (ragged robin)

Moist rocky slopes.

Epilobium angustifolium (fireweed)

Moist disturbed areas.

OPHIOGLOSSACEAE (Grape Fern Family)

Botrychium virginianum (rattlesnake fern)

Moist edges of wetlands under forest canopy.

ORCHIDACEAE (Orchid Family)

Corallorhiza maculata (spotted coral-root)

Woods.

Corallorhiza striata (stripped coral-root)

Woods.

Corallorhiza trifida (yellow coral-root)

Woods.

Goodyera oblongifolia (western rattlesnake-plantain)

Conifer forests.

Habenaria dilatata (white bog-orchid)

Wet boggy areas.

Habenaria elegans (elegant rein-orchid)

Moist woods.

*Habenaria saccata (slender bog-orchid)

Boggy areas.

Listera caurina (western twayblade)

Moist woods.

Listera convallarioides (broad-lipped twayblade)

Moist woods.

OROBANCHACEAE (Broomrape Family)

*Orobanche uniflora (naked broomrape)

Open slopes.

PINACEAE (Pine Family)

Abies grandis (grand fir)

Moist woods.

Abies lasiocarpa (subalpine fir)

Higher elevation slopes.

Larix occidentalis (western tamarack)

Moist woods.

Picea engelmannii (Engelmann spruce)

Moist woods.

Pinus contorta (lodgepole pine)

Well drained higher elevation woods.

Pinus monticola (western white pine)

Moist forests.

Pinus ponderosa (ponderosa pine)

Dryer forests.

Pseudotsuga menziesii (Douglas-fir)

Forests.

Tsuga heterophylla (western hemlock)

Moist forests.

POACEAE (Grass Family)

* <u>Agropyron spicatum</u> (bluebunch wheatgrass)	Open slopes.
<u>Agropyron caninum</u> (slender wheatgrass)	Open slopes.
<u>Bromus tectorum</u> (cheatgrass brome)	Disturbed areas.
* <u>Calamagrostis purpurascens</u> (purple reedgrass)	Rocky areas.
<u>Calamagrostis rubescens</u> (pinegrass)	Woods and slopes.
<u>Dactylis glomerata</u> (orchard-grass)	Meadows and disturbed areas.
* <u>Danthonia californica</u> (California danthonia)	Meadows and open woods.
<u>Danthonia spicata</u> (poverty danthonia)	Open slopes.
<u>Deschampsia elongata</u> (slender hair-grass)	Open slopes.
<u>Festuca idahoensis</u> (Idaho fescue)	Open slopes.
<u>Glyceria borealis</u> (northern mannagrass)	Wetlands.
<u>Melica smithii</u> (Smith's melic)	Moist woods.
* <u>Melica subulata</u> (Alaska oniongrass)	Meadows and shaded areas.
<u>Orzopsis asperifolia</u> (roughleaf ricegrass)	Forest floor.
<u>Phalaris arundinacea</u> (reed canarygrass)	Wetlands.
<u>Phleum pratense</u> (common timothy)	Meadows and disturbed moist areas.
<u>Poa secunda</u> (Sandberg's bluegrass)	Open slopes.
<u>Trisetum canescens</u> (tall trisetum)	Open slopes.

POLEMONIACEAE (Phlox Family)

<u>Collomia linearis</u> (narrow-leaf collomia)	Open hillside.
<u>Microsteris gracilis</u> (pink microsteris)	Open gravelly slopes.

POLYGONACEAE (Buckwheat Family)

<u>Eriogonum flavum</u> (yellow eriogonum)	Open slopes.
<u>Eriogonum umbellatum</u> var. <u>subalpinum</u> (sulphur buckwheat)	Open slopes.
<u>Polygonum douglasii</u> (Douglas' knotweed)	Slopes.
<u>Polygonum minimum</u> (leafy dwarf knotweed)	Rocky slopes.
<u>Rumex acetosella</u> (sheep sorrel)	Disturbed areas.

POLYPODIACEAE (Fern Family)

* <u>Aspidotis densa</u> (podfern)	Moist rocky crevices.
<u>Cheilanthes gracillima</u> (lace lipfern)	Moist rocky crevices.
<u>Cryptogramma acrostichoides</u> (parsley fern)	Moist rocky crevices.
* <u>Cystopteris fragilis</u> (brittle bladderfern)	Rocky areas and woods.
<u>Dryopteris felix-mas</u> (malefern)	Moist woods.
<u>Gymnocarpium dryopteris</u> (oakfern)	Moist woods.
* <u>Polypodium vulgare</u> (common polypody)	Moist rocky crevices.
* <u>Polystichum munitum</u> (western sword hollyfern)	Moist woods.
<u>Pteridium aquilinum</u> (brackenfern)	Disturbed areas.
* <u>Woodsia scopulina</u> (Rocky Mountain woodsia)	Moist rocky areas.

PORTULACACEAE (Purslane Family)

* <u>Montia parvifolia</u> (little-leaved montia)	Moist seep areas.
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PRIMULACEAE (Primrose Family)

* <u>Lysimachia thysiflora</u> (water loosestrife)	Wetlands.
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RANUNCULACEAE (Buttercup Family)

<u>Clematis occidentalis</u> (western clematis)	Woods.
<u>Coptis occidentalis</u> (western goldthread)	Moist woods.
<u>Delphinium bicolor</u> (little larkspur)	Open slopes.
<u>Delphinium nuttallianum</u> (Nuttall's larkspur)	Slopes.
<u>Ranunculus aquatilis</u> (hairleaf water buttercup)	In ponds and wetlands.
* <u>Ranunculus flammula</u> (creeping buttercup)	Wetlands.
* <u>Ranunculus pensylvanicus</u> (Pennsylvania buttercup)	Wet areas.
<u>Ranunculus uncinatus</u> (little buttercup)	Moist areas and edges of wetlands.
<u>Thalictrum venulosum</u> (veiny meadowrue)	Moist shaded edge of woods.

RHAMNACEAE (Buckthorn Family)

Ceanothus velutinus (mountain balm)

Open woods.

ROSACEAE (Rose Family)

Amelanchier alnifolia (alderleaf serviceberry)

Woods and slopes.

Fragaria vesca (woods strawberry)

Woods and meadows.

Geum macrophyllum (large-leaved avens)

Wet meadows.

Holodiscus discolor (creambush oceanspray)

Woods and rocky slopes.

Physocarpus malvaceus (mallow ninebark)

Open woods and slopes.

Potentilla glandulosa (sticky cinquefoil)

Rocky slopes.

Potentilla palustris (purple cinquefoil)

Wetland areas.

Rosa woodsii (woods rose)

Valleys and slopes.

Rubus idaeus (red raspberry)

Rocky slopes and thickets.

Rubus parviflorus (thimbleberry)

Moist woods.

Sorbus scopulina (Cascade mountain-ash)

Woods and thickets.

Spiraea betulifolia var. lucida (shiny-leaf spiraea)

Dryer woods and slopes.

Spiraea douglasii (Douglas spiraea)

Moist areas near streams, lakes or wetlands.

*Spiraea x pyramidata (pyramidal spiraea)

Disturbed areas.

RUBIACEAE (Madder Family)

Galium aparine (goose-grass)

Woods and slopes.

Galium boreale (northern bedstraw)

Woods, slopes, and meadows.

Galium trifidum (small bedstraw)

Wetlands.

Galium triflorum (sweetscented bedstraw)

Moist woods and banks.

SALICACEAE (Willow Family)

Populus balsamifera (balsam poplar)

Valley bottoms.

Populus tremuloides (trembling aspen)

Moist hillsides.

Populus trichocarpa (black cottonwood)

Valley bottoms.

Salix spp. (willow)

Valley bottoms and moist thickets.

SAXIFRAGACEAE (Saxifrage Family)

Heuchera grossulariifolia (gooseberry-leaved alumroot)

Rocky areas.

Mitella pentandra (five-stamened mitrewort)

Moist meadows.

*Mitella stauropetala (side-flowered mitrewort)

Moist woods.

Parnassia kotzebuei (Kotzebue's grass-of-parnassus)

Moist woods.

Saxifraga bronchialis (spotted saxifrage)

Rocky areas in mountains.

Saxifraga ferruginea (rustyhair saxifrage)

Moss-covered rocky hillside.

*Suksdorfia ranunculifolia (buttercup-leaved suksdorfia)

Open slopes.

Tiarella trifoliata (trefoil foamflower)

Moist woods under forest canopy.

SCROPHULARIACEAE (Figwort Family)

Castilleja crista-galli (cocks-comb paintbrush)

Dry slopes.

*Castilleja miniata (scarlet paintbrush)

Woods and thickets.

Collinsia parviflora (small-flowered blue-eyed Mary)

Open slopes and woods.

Melampyrum lineare (narrow-leaved cow-wheat)

Meadows.

*Mimulus breweri (Brewer's monkey-flower)

Open slopes.

*Mimulus floribundus (purple-stem monkey-flower)

Moist ravines.

Mimulus guttatus (common monkey-flower)

Wetlands.

Pedicularis bracteosa (bracted lousewort)

Moist wooded slopes.

Pedicularis contorta (coiled-beak lousewort)

Moist wooded slopes.

Pedicularis racemosa (sickle-top lousewort)

Moist wooded slopes.

Penstemon confertus (yellow penstemon)

Moist meadows.

Penstemon fruticosus (bush penstemon)

Rocky outcrops.

*Penstemon lyallii (Lyall's beardstongue)

Rocky outcrops.

*Penstemon wilcoxii (Wilcox's penstemon)

Woods and slopes.

Veronica americana (American speedwell)

Moist areas.

Veronica arvensis (common speedwell)

Disturbed areas.

*Veronica officinalis (speedwell)

Disturbed areas.

SELAGINELLACEAE (Spike Moss Family)

*Selaginella wallacei (Wallace selaginella)

Covering rocky areas.

SPARGANIACEAE (Bur-reed Family)

Sparganium emersum (simplestem bur-reed)

Wetlands, usually in water.

Sparganium minimum (small bur-reed)

Wetlands, usually in water.

URTICACEAE (Nettle Family)

Urtica dioica (stinging nettle)

Moist areas.

VALERIANACEAE (Valerian Family)

Valeriana dioica (northern valerian)

Moist woods.

VIOLACEAE (Violet Family)

*Viola glabella (round-leaved violet)

Moist woods.

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